

Annual Index of Articles: 1994

ADMIXTURES

A Contractor's Guide to Superplasticizers: Provides an overview of the characteristics of various high-range water reducers (HRWRs), or superplasticizers, and tells how the admixtures affect set time and slump loss. Also addresses adding HRWRs at the plant or on-site, redosing, and delaying addition. (3 pp; 94:547)

Using Slag to Enhance Concrete Performance: Explains how ground granulated blast-furnace (GGBF) slag can improve fresh concrete's workability and increase hardened concrete's strength and durability. Also addresses slag's effects on the setting time, heat of hydration, and curing of fresh concrete and its effects on the color, alkali-silica reactivity, and sulfate resistance of hardened concrete. (4 pp; 94:235)

ARCHITECTURAL CONCRETE

The Beauty of Architectural Concrete: Author assembles photos of eight structures that exemplify architectural concrete's beauty. Also includes a brief analysis of each example. (3 pp; 94:353)

Why Architects Choose Concrete: Discusses why concrete is the material of choice for many architects and structural engineers. By examining various concrete structures, the article provides an overview of concrete's desirable characteristics, including its strength, durability, economy, thermal efficiency, sound attenuation, and readiness to assume different forms, colors, and textures. (5 pp; 94:332)

ASSOCIATIONS

Association Membership: a Valuable Resource: Lists the addresses, telephone numbers, and fax numbers of the following organizations: the Concrete Reinforcing Steel Institute, the American Concrete Pavement Association, and the Portland Cement Association. Also includes information about the organizations' missions, membership requirements, educational services, technical publications, computer software programs, promotional activities, and chapter activities. (2 pp; 94:365)

BRIDGES

Making Concrete Bridges Beautiful: Explores the need for bridges that are not only economical but also elegant. Emphasizes that architects and engineers should attend to bridges' aesthetic qualities, such as proportion, refinement of form, integration into the environment,

color, and surface texture. (7 pp; 94:790)

Setting Screed Rails for Bridge Deck Paving: Tells how to set screed rails to meet deck grade tolerances. Describes the placement of screed rails on either exterior girders or formed overhangs. (7 pp; 94:779)

CONCRETE BASICS

January (1 p; 94:15)

- Jobsite Concrete Planner

February (1 p; 94:143)

- Concrete Mix—Rules of Thumb

March (1 p; 94:217)

- Quality Control Tests

April (1 p; 94:331)

- Placing Concrete

May (1 p; 94:401)

- Vibrating Concrete

June (1 p; 94:477)

- Finishing Tools

July (1 p; 94:545)

- Initial Finishing

August (1 p; 94:613)

- Final Finishing

September (1 p; 94:681)

- Jointing Concrete

October (1 p; 94:765)

- Curing Concrete

November (1 p; 94:841)

- Hot-weather Concreting

December (1 p; 94: 945)

- Cold-weather Concreting

CONCRETE CANOES

Concrete Canoes Make a Big Splash in New Orleans: Profiles the seventh annual American Society of Civil Engineers' National Concrete Canoe Competition, sponsored by Master Builders Inc. Briefly summarizes the 1994 winners, the participating schools, and the judging criteria. Also includes a winning team member's account of the design and construction of the first-place canoe. (5 pp; 94:686)

CONSOLIDATION

Consolidating Concrete in Congested Areas: Explains how to consolidate the problem areas around reinforcing steel, embedments, boxouts, prestress ducts, anchorages, and certain form shapes. Covers design considerations, such as rebar, embedment, boxout, and formwork arrangement, and addresses issues such as modified mix proportions and various placement and consolidation methods. (5 pp; 94:228)

CURING

An Analysis of Curing Methods for

Poured Concrete Walls: Discusses the results of a study examining the effects of curing methods and form removal times on concrete wall performance. Helps engineers achieve a proper balance between curing times and economic considerations. (4 pp; 94:147)

DESIGN

Choosing Design Methods for Industrial Floor Slabs: Discusses how to select a suitable design for an industrial floor slab after analyzing key factors such as loading conditions and different types of floor slab construction. (5 pp; 94:346)

CRSI Announces 1994 Design Award Winners: Provides names and project details of the four winners of the Concrete Reinforcing Steel Institute's 1994 Design Award competition, cosponsored by the American Institute of Architects. (2 pp; 94:360)

Simplified Flexural Design for Beams and Slabs: Provides engineers with efficient design methods that minimize moderate-sized structures' building costs while complying with ACI 318 strength and serviceability requirements. Also includes design decisions that reduce formwork costs and tips for economical detailing of formwork. (4 pp; 94:338)

Updating Design Building Codes for Basement-wall Construction: Explains the importance of the National Ready Mixed Concrete Association's proposed changes to the thickness design tables for plain concrete basement walls. Discusses current building codes as well as backfill materials, soil classes, and lateral soil loads. (3 pp; 94:723)

EQUIPMENT

New Pickup Trucks Built for the Jobsite: Highlights the 1994 models' specifications, features, and improvements. Also provides tips for truck buyers. (6 pp; 94:16)

Portable Generators Supply Power Where It's Needed: Examines various portable generators and includes criteria users should consider before determining the proper generator for the job. Explains the importance of induction loads, wattage requirements, starting watts, and running watts. (3 pp; 94:428)

Portable Heaters for the Jobsite: Provides an overview of common electric and fuel-fired heaters. Discusses heating capacity; energy utility, availability, and storage; and heater efficiency, portability, and safety features. (6 pp; 94:800)

Selecting a Material Spreader: Describes the operation of truss-type and

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Selecting a Material Spreader: Describes the operation of truss-type and

telescopic-boom material spreaders. Also includes important buyer considerations, such as truss bridge-section lengths and weights, boom lengths, hopper and spreader head sizes, rate of material-flow adjustment, and material spreading rate. (3 pp; 94:564)

Selecting and Operating a Portable Hydraulic Power Unit: Contains tips on choosing the right portable hydraulic power unit for the job and using it safely. Advises readers to consider hydraulic fluid flow ratings, pressure ratings, sizes, fuel capacities, and special features such as automatic throttles, fan-cooled hydraulic systems, and cut-off switches. (4 pp; 94:650)

FINISHING

A Hiring Test for Finishers: Suggests that contractors obtain applicants' references, administer hiring tests, and scrutinize finishing credentials to determine qualified candidates. Recommends using interviews to test applicants' knowledge of concrete materials, finishing tools, and finishing techniques. Includes a sample quiz. (5 pp; 94:500)

Tips from Successful Finishing Contractors: Five leading contractors say that, to a large degree, success depends on factors such as controlling costs, training employees, and continuing to adapt to industry changes. (3 pp; 94:479)

FLATWORK

Fancy Flatwork: Contractor provides tips on coloring and imprinting concrete surfaces. Briefly covers subgrades, reinforcement, stamping tools, color hardeners, colored release agents, and surface sealers. (2 pp; 94:511)

Long-strip Concrete Placement: Emphasizes that the long-strip construction method can affect the levelness of slabs on grade and tells contractors how to satisfy levelness criteria. (3 pp; 94:46)

Misunderstandings and Abuses in Flatwork Specifications: Stresses that knowing how the F-number system functions can help ensure satisfactory slab surface profiles. Explains the importance of precise specifications, specified overall values, minimum local values, F-number measurements, and, if necessary, corrective measures. (5 pp; 94:492)

FORM LINERS

Plastic Form Liners: Provides an overview of plastic form liners by describing some of the available patterns and profiling various liner materials, such as rigid plastics, glass-fiber-reinforced plastics, elastomeric plastics, and polystyrene foam. Also gives tips for using the form liners properly. (7 pp; 94:847)

FORMWORK

Coping With Formwork Specifications: Warns contractors that they need to carefully read and clarify specifications before signing a contract. Describes typical formwork issues that concrete contractors should consider, including stripping time, reshoring provisions, construction tolerances, camber, and composite construction. (5 pp; 94:870)

Deck Forms for Girder Bridges: Describes how removable and stay-in-place formwork systems and accessories can increase contractors' productivity. (4 pp; 94:771)

Giant Wall Pour Requires Three Forming Systems: Tells why a tight construction schedule for an underground tank reservoir dictated the use of three different forming systems: wood-beam gang forms backed with steel-channel walers, hand-set steel-framed plywood form panels, and job-built plywood forms. This formwork selection helped the contractor complete a monolithic wall pour requiring 712 cubic yards of concrete. (2 pp; 94:253)

Jump Forms Speed Erection of Airport Control Tower: Describes how the 166-foot-tall octagonal concrete shaft for a new control tower at O'Hare International Airport, Chicago, was erected efficiently using a versatile jump-forming system that allowed builders to overcome the problem of limited space and maintain a five-day construction cycle. (3 pp; 94:866)

Massive Tunnel Under Runway Built to Support Jet Aircraft: Describes the innovative footing and roof forming systems used to build a vehicular tunnel at Detroit Metropolitan Airport. Explains that the formwork did not require shoring, which facilitated construction and saved costs. (4 pp; 94:184)

FURNITURE

Concrete Seating Enhances Terraced Patio: Architect explains how he designed and cast benches made of lightweight foamed concrete. The procedure included making the molds, designing the mix, casting the concrete, and installing the curved benches. (4 pp; 94:179)

HISTORY

19th-century Kansas Comes of Age: Tells the history of a 540-foot-long reinforced-concrete arch bridge built in Topeka, Kan., according to Joseph Melan's patented design and opened to traffic in 1898. (3 pp; 94:271)

The Panama Canal: Eightieth Anniversary: Provides a brief history of the concrete construction of the Panama Canal, built between 1904 and 1914. Describes the formwork for the culverts, tunnels, and lock walls, as well as the

concrete batching and mixing operations and the concrete delivery and placement. (4 pp; 94:959)

INTERNATIONAL CONSTRUCTION

Concrete Construction in Russia: A construction industry investigator and accident prevention specialist relates his March 1993 visit to concrete construction sites in Moscow and St. Petersburg. Includes descriptions of Russian building design, formwork, material handling, tools, and safety practices. (5 pp; 94:151)

LEGAL

Ripping-out Work Ruled Economic Waste: Summarizes the case of Granite Construction Co. vs. United States (1992) in which the U.S. Court of Appeals ruled that when a contractor substantially complies with a contract's specifications, the owner may not require replacement of the work if replacement would amount to economic waste. (1 p; 94:441)

LIFT SLAB

Raising the Roof: Describes how a Miami contractor raised a shopping mall's 4-million-pound concrete roof slab more than 10 feet. Details the contractor's use of a hydraulically powered lifting mechanism rather than shoring. (3 pp; 94:581)

METRIC

Converting to Metric Reinforcing Bars: Provides tables to help contractors switch from inch-pound bar sizes and grades to the metric equivalents (1 p; 94:966)

Metrics Are Coming: Explains why concrete contractors should prepare for the construction industry's conversion to the International System of Units (SI), the metric system adopted by the U.S. federal government. Provides a wealth of tables and charts to help contractors make the switch. (5 pp; 94:878)

MIX DESIGN

Concrete Mixes for Interior Slabs on Grade: Provides a guide for readers to consult when choosing a concrete mix for interior slabs. The table's sample mix designs include criteria such as ambient temperature, delivered concrete temperature, mix ingredients, and ingredient cost. (1 p; 94:499)

NOTABLE PROJECTS

Thick Swamp Land No Obstacle for Louisiana Contractor: Describes how an award-winning, end-on construction technique was used to build a challenging 2-mile section of elevated twin bridge interstate highway (I-310) through an environmentally sensitive cypress swamp just west of New Orleans. Details the end-on construction technique, in which workers built one span at a time so that

construction machinery would not be placed on the swamp floor. (3 pp; 94:25)

Twin Concrete Tanks Feature 52-foot-tall Walls: Profiles an Ohio refinery's two stormwater retention tanks, which feature the tallest reinforced-concrete radius walls in the country. Relates how the construction of the 200-foot-diameter structures required a space-saving retaining wall system and a four-day forming cycle to cut wall-construction time in half. (3 pp; 94:576)

U.S. Army Corps of Engineers: New Orleans District: Provides a brief overview of the U.S. Army Corps of Engineers' work along the lower Mississippi River. Covers the completion of an 8.2-mile-long concrete floodwall, the production and placement of precast concrete mats, and the placement of concrete slope pavements on levees. (4 pp; 94:33)

NOTABLE STRUCTURES

Concrete: Gateway's Most Valuable Player: Describes the construction of downtown Cleveland's Gateway sports complex, which required approximately 150,000 cubic yards of cast-in-place concrete in addition to more than 11,000 precast pieces. Also includes information on mix specifications, admixtures, rebar couplers, plastic deck forms, column forms, and wall forms. (4 pp; 94:222)

PATTERN STAMPING

Leaving a Lasting Impression: Overview of the concrete stamping and coloring process. Provides information about pattern stamping mats and rollers, stencils, integrally colored concrete, dry-shake colored concrete, and acid stains. (4 pp; 94:692)

PAVING

Concrete Airport Pavements Make a Comeback: Describes New York City-area airports' growing need for and use of high-quality concrete pavements on aprons and taxiways. Reasons accounting for this development include improved mix designs, favorable bid prices, greater contractor latitude, and new "end-result" paving specifications. (2 pp; 94:276)

Machines Behind the Slipformer: Showcases the equipment that performs finishing, texturing, and curing operations immediately after slipform paving. Covers texture-cure machines and various finishing attachments. (3 pp; 94:423)

1994 Pavement Award Winners Illustrate Pride and Innovation: Provides names and project details of the winners and runners-up in the fifth annual National Awards Program for Excellence in Concrete Pavement, sponsored by the American Concrete Pavement Association

and Concrete Construction. (5 pp; 94:946)

Permanent Pavements: This commentary advocates the construction of permanent pavements in the United States. Declares that motorists and public officials should expect quality pavements and that engineers and paving contractors should meet the challenge of building permanent pavements. (2 pp; 94:362)

Simplifying Slope Paving: Describes how slope pavers, slope slipformers, and hydraulic roller screeds can reduce labor requirements, increase production rates, and improve concrete uniformity when paving structures such as canals and drainage channels. (4 pp; 94:410)

Tips from Successful Paving Contractors: Five paving executives relate how they deliver high-quality pavements; important elements include attention to employees, training, scheduling, and equipment. (3 pp; 94:406)

Two-layer European Pavement Tested in U.S.: Tells how the Michigan Department of Transportation is analyzing the performance of sample European and U.S. pavements on a 2.1-mile section of Detroit's I-75. Comparisons include pavement design, strength, maximum water-cement ratio, minimum cement content, maximum slump, air content, and cost effectiveness. (5 pp; 94:156)

PRECAST CONCRETE

New Orleans' New Eye in the Sky: Describes the construction of New Orleans International Airport's 207-foot-high air-traffic control tower, supported by four precast, post-tensioned concrete legs. States that each leg consists of 23 precast modules, and each module weighs 36,000 pounds, stands 7½ feet tall, and is approximately 10 feet square. (2 pp; 94:31)

PROBLEM CLINIC

January (2 pp; 94:66)

- Bushhammering
- Vertical Pumping
- Ammonia Smell from Fresh Concrete

February (1 p; 94:188)

- Tolerances for Slab-on-grade Thickness
- Using Gap-graded Aggregate

March (1 p; 94:252)

- Some Rust on Rebar is Acceptable
- Unreasonable Floor Tolerance

April (1 p; 94:367)

- Grooved Joints Blamed for Plow Damage
- Replacing Hard Hats
- Waterproofing Versus Dampproofing

May (1 p; 94:438)

- Does Polyethylene Sheeting Beneath Slabs Degrade?

- Store Bull Floats out of the Sun to Prevent Warping
- June (2 pp; 94:508)**
- Hiring a Good Shotcrete Nozzleman
- July (2 pp; 94:584)**

- Limit Air Content in Floors to Receive Dry-shake Hardeners
- Chloride Permeability Testing of Field-cured Concrete

August (1 p; 94:654)

- Maximum Allowable Time from Initial Batching to Placement

September (1 p; 94:728)

- Effect of Salt on Nonreinforced Concrete
- Cleaning Concrete Discolored from Blast-furnace Slag

October (1 p; 94:809)

- Relationship Between Seven-day and 28-day Strengths

November (1 p; 94:894)

- Lateral Pressures on One-sided Wall Forms

December (2 pp; 94:968)

- Can Cement Balls Cause Cracks?
- When to Protect Fresh Concrete from Freezing.

PUMPING

Clearing Pump Line Blockages: Explains how to recognize, locate, and remove line blockages quickly and safely. Includes discussions of the three main causes of concrete pumping system blockages: mix design deficiencies, pipeline and joint deficiencies, and operating error. (3 pp; 94:632)

How a Concrete Pump Works: Briefly describes the operation of twin-cylinder piston pumps and their different valve systems. Profiles gate valves, rock valves, swing tubes, C tubes, and hydraulic and mechanical ball valves. (2 pp; 94:629)

Tips from Successful Pumping Contractors: Five leading concrete pumping contractors say that customer service, people, and dependable equipment—not low price—are keys to success. (8 pp; 94:619)

What's New in Truck-mounted Boom Pumps: Examines the features and performance capabilities of some of the latest models. Advises readers to consider boom design, pump type, outriggers, and truck-chassis requirements when selecting a truck-mounted boom pump. Also includes tips on selecting the right machine for the job. (6 pp; 94:643)

READY MIX

Adjusting Slump in the Field: Discusses why slump varies and how workers can adjust it. Describes how to test slump and informs readers that slump is affected by different batching tolerances, aggregate moisture contents, concrete temperatures, and times for mixing, delivering, and unloading concrete. (4 pp; 94:38)

REINFORCEMENT

Epoxy-coated Rebar: Handle With Care: Emphasizes that certain jobsite practices can minimize coating damage. Discusses how to increase corrosion resistance by carefully inspecting, handling, storing, placing, splicing, cutting, bending, and straightening epoxy-coated rebar. Also advises readers to pay attention to concrete placing and consolidating, which can affect epoxy-coated rebar. (4 pp; 94:356)

Reinforcing Bar Supports: Discusses a variety of rebar supports to demonstrate how using the right type can enhance concrete's durability and maintain its structural integrity. Includes information about wire, concrete, cementitious fiber-reinforced, all-plastic, and epoxy-coated bar supports. (4 pp; 94:569)

REPAIR

Detroit-Windsor Tunnel Gets a Face-lift: Describes how a contractor performed all restoration work at night, opening the 1-mile-long tunnel under the Detroit River to traffic during the day. Details contract requirements, such as removal of granite-faced concrete curbs, installation of new concrete curbs, use of rapid-set concrete to repair roadway, use of shotcrete to repair lower tunnel wall, and replacement of concrete soffits. (3 pp; 94:434)

RESIDENTIAL

Concrete Fencing: Describes different types of precast and cast-in-place residential concrete fencing systems. Discusses post-and-panel and split-rail systems; shotcrete-applied wall-panel systems; and smooth-faced, ribbed, and board-and-bat wall forms. (3 pp; 94:698)

SAFETY

ACPA Names Operator Safety Award Winner: Provides a brief overview of the Operator Safety Award, cosponsored by the American Concrete Pumping Association and The Aberdeen Group; ACPA's comprehensive safety certification program for concrete pump operators; and the award winner's safety practices. (2 pp; 94:62)

Beware of Protruding Rebar: Warns that protruding rebar is one of the top physical hazards OSHA inspectors find on construction sites. Also describes various precautionary measures. (2 pp; 94:219)

Dressing for Safety: Explains the importance of wearing the right personal protective equipment, which can protect workers from job hazards such as sharp or falling objects, slippery surfaces, airborne dust, toxic fumes, and corrosive substances. (2 pp; 94:403)

Excavation Safety for the Concrete Contractor: Summarizes OSHA excavation standards, explains their importance, and defines the responsibilities of the OSHA competent employee who ensures safe jobsite conditions. (3 pp; 94:683)

Get Ready for the New Fall-protection Standard: Summarizes OSHA's new fall-protection standards, effective February 1995, and describes how the changes will affect contractors. (3 pp; 94:767)

Identify Jobsite Safety Hazards Before OSHA Inspectors Do: Informs readers about OSHA's free on-site consultation service, which can help contractors recognize and correct dangerous jobsite conditions. (2 pp; 94:11)

Pump Line Safety: Provides workers with simple safety guidelines to prevent accidents when pumping concrete. Also explains the importance of proper procedures for pumping operations, handling blockages, and cleaning lines. (2 pp; 94:615)

Stripping Wall Forms Safely: Tells how to meet OSHA requirements when stripping elevated handsets. Describes how to prevent falls by tying off to form safety eyes, form ties, rebar, or lifelines, and by using scaffold brackets. (3 pp; 94:843)

Tool Ergonomics: Tells how to avoid injury by choosing hand and power tools for comfort as well as safety. Lists characteristics of ergonomically designed tools. (2 pp; 94:327)

SAWING

Saw Cutting Concrete Flatwork: Explains how to select a saw by considering the type of concrete to be cut (green, hardened, or reinforced) and the type of aggregate in the concrete. Discusses additional criteria such as saw size, blade type, power source, cooling system, and operating speed. (7 pp; 94:483)

SEALERS

Using Worksheets to Select Water Repellents: Provides sample worksheets to help users analyze water repellents for both horizontal and vertical surfaces. Lists criteria that products should satisfy—including various ASTM, AASHTO, and NCHRP standards. (2 pp; 94:144)

SHORING

Shoring Basics: Provides tips for shoring system design, bracing, erection, and removal. Also briefly describes how shoring procedures are affected by the challenges of multistory construction. (6 pp; 94:856)

SPECIALTY CONCRETE

Concrete for Every Application: Provides an overview of different specialty

concretes, such as lightweight, heavy-weight, high-strength, preplaced aggregate, roller-compacted, and porous concrete. Also discusses various admixtures used in these specialty concretes, including silica fume particles, ground granulated blast-furnace slag, fly ash, and polymers. (5 pp; 94:556)

TESTING

Measuring Pavement Profile: Overview of various profilographs, which are used on the jobsite to quickly and accurately measure pavement smoothness; the devices' readings make daily field adjustments possible. Also includes tips for ensuring smooth pavements. (6 pp; 94:416)

TILT-UP

Award Winners Demonstrate Tilt-up's Versatility: Provides names and project details of the six winners in the 1994 Tilt-Up Achievement Awards, sponsored by the Tilt-Up Concrete Association. (3 pp; 94:505)

Building Features Curved Tilt-up Panels: Outlines how a builder used ten curved tilt-up sandwich panels to construct a distribution center. Photos illustrate the principal construction steps. (2 pp; 94:52)

Residential Tilt-up in Colorado: Tells how a home builder constructs cost-effective, efficient tilt-up homes using insulated concrete sandwich panels that feature patented connecting rods made of a plastic resin/glass fiber composite material. (4 pp; 94:703)

Tilt-up Opportunities in New Markets: Explains the advantages of tilt-up and discusses the characteristics that contractors need to successfully introduce tilt-up to new markets. (3 pp; 94:953)

TOPPINGS

Armor Floor Surfaces With Metallic Aggregates: Details the use of metallic aggregate dry-shake hardeners to maximize life expectancy and reduce maintenance needs of industrial concrete floors. Discusses premixed and job-mixed products, coverage-rate determination, and product application by hand or mechanical spreader. (3 pp; 94:551)

WHITETOPPING

Designing Whitetopped Parking Lots to Last: Discusses how whitetopping can rejuvenate deteriorated asphalt parking lots. Emphasizes how to ensure long-term overlay performance by considering elements such as drainage, pavement thickness, concrete strength, and grade and joint design. (3 pp; 94:343)